1. Find the slope of the line through (a+3b,4c) and (2b+a, c).

\_\_\_\_\_\_\_\_\_

2. If a line has slope -2/3 and contains the points (6,-3) and (3, x), find x.

\_\_\_\_\_\_\_\_\_

3. Find the x-intercept and the y-intercept of the line 24x -10y = 16.

\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_

Show how to use your intercepts above to find the slope.

\_\_\_\_\_\_\_\_\_

4. What is the slope of the line through the points (2-a, 9) and (2-a, 4)? \_\_\_\_\_\_\_

What is the equation of this line?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. What is the equation of the line with an undefined slope that passes through the point (6,3)?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Graph this line below:

**Linear Models**

1. The speeding fine for driving 10 mph over the speed limit is $80 and the fine for driving 20 mph over the limit is $200. Assuming a linear relationship:

a) What is the independent variable?\_\_\_\_\_\_\_\_\_

b) What is the slope, including units?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c) What does it mean?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

d) Write an equation to model this situation

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

e) what does your model predict the fines would be for someone going 18 mph over the limit?\_\_\_\_\_\_ 24 mph over the limit? \_\_\_\_\_\_\_

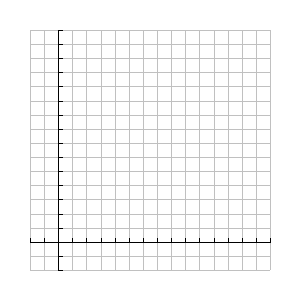
f) While you are sitting in traffic court waiting for your turn, you tune in just in time to hear someone fined $350 for speeding. How many mph over the limit do you think they were going? \_\_\_\_\_\_\_\_\_ and what was that limit? \_\_\_\_\_\_\_\_

g) What is the x-intercept? \_\_\_\_\_\_ and what does it mean in the context of this problem? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

h) What is a reasonable domain? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

i) What is the range? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

j) Draw a reasonable graph of this situation below:

2. In 1990, a house was purchased for $140,000. In 2004, it was appraised for $170,000. If this relationship was linear during this time,

a) find the linear equation to model this situation. Clearly define your variables.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) If this house was built in 1975, what does your model predict the value of the house was then?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. The College Park community pool holds 220,000 gallons of water. This pool has a drain system which is capable of removing water at a rate of 20 gallons per minute.

a) Write an equation to model the draining of the pool.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

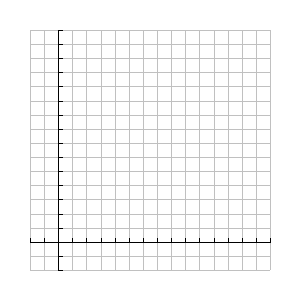
b) What are the 2 intercepts and what do they mean?

x-intercept: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

y-intercept: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

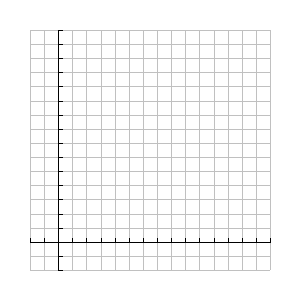
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

d) Graph your line below over a reasonable domain. Label your axes.

e) On July 4th, a flock of birds in nearby trees is startled into frantic flight by the fireworks. During their fleeing flight frenzy, the birds make an unfortunate deposit in the pool. (and we’re not talking the ATM type of deposit!) Anyway, on the morning of July 5th, the pool emits a rather pungent odor and is a color most suspect. Officials are called in and it is decided that the pool MUST be drained. How long will it take to drain the pool?

f) The pool manager (seeing $$ go ‘down the drain’ on the peak holiday week) decides that he can skimp on the whole draining thing and decides to drain ½ of the pool and then refill it. If the pool can refill at a rate of 15 gallons per minute, how long will it be until the pool is drained and refilled?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

g) Draw a graph for f) below. Write a piecewise function for your graph.

4. The value of an automobile decreases with time. A student who wanted to buy a new car talked to a salesman and found out that his current car, which is 35 months old, had a trade-in value of $5770. One year earlier when he was talking with a different car salesman, he had been told that his car had a trade-in value of $8230. Assume. that the car’s value depreciated linearly as a function of time.

a) The independent variable is \_\_\_\_\_\_\_\_

b) What is the slope? \_\_\_\_\_\_\_\_ and what does it mean?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c) Find the linear equation to model this situation.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

d) If the student wishes to trade in his car before its value drops below $2000, when should he trade it in?

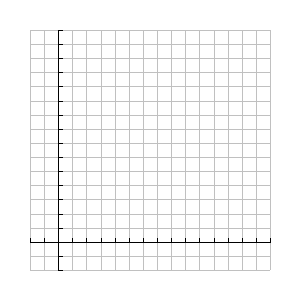
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

e) What is the y-intercept? \_\_\_\_\_\_\_ and what does it mean?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

f) What is the x-intercept? \_\_\_\_\_\_\_ and what does it mean?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

g) Graph this function below over a reasonable domain. Label your axes.

5. A professor at a large university gave a test in her math course. Afterwards, she decided to scale the grades. Since the highest grade was a 93, she wanted to convert it to a scaled grade of 100. She decided that those papers that had scores of 45 or better had demonstrated enough knowledge of the course to receive a passing grade, so she wanted to convert the 45 to a 60. A linear relationship seemed reasonable. Using f for the first score and s for the scaled score, find:

a) dependent variable? \_\_\_\_\_\_\_\_\_\_

b) Slope? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ What does this mean? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

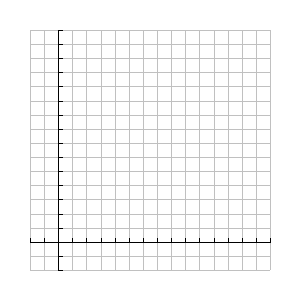
c) equation? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

d) What scaled score would be assigned to a paper that originally earned a 56? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

e) If a paper received a scaled score of 87.5, what was the student’s original grade? \_\_\_\_\_\_\_\_\_\_\_\_\_

f) What is the s-intercept and what does it mean?

g) What is the f-intercept and what does it mean?

h) What interval of original scores would earn a scaled score of B [80,90) ?

i) Graph.